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MEANS OF NEUTRALIZING THREAT COSMIC OBJECTS

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MEANS OF AFFECTING THREAT COSMIC OBJECTS.

The aim of studies into the means of affecting threat cosmic objects (TCO) is to find out the TCO neutralization technologies:

- methods and technologies of exploding thermonuclear charges;
- specialized thermonuclear charges and means providing their efficiency which ensure an efficient terrestrial defense under restricting parameters presented by potential specifications of TCO detection systems and systems of the operation platform delivery to the point of TCO encounter over the range of TCO physical characteristics as wide as possible:
  - dimension form;
  - chemical composition;
  - mechanical and strength characteristics;
  - rotation;
  - gas and dust environments.

EXPLODING TECHNOLOGY OF TCO NEUTRALIZATION.

1. Contact exploding of thermonuclear charges.

2. Deepened exploding of thermonuclear charges.

3. Sequential exploding of thermonuclear charge series.

4. Remote TCO affecting. Technologies of "intermediate bodies". Technologies of "rendezvous" conditions.

RESULTS OF WORKS ON SELECTING TECHNOLOGIES OF TCO NEUTRALIZATION MEANS SHOULD INCLUDE:

- the maximum efficient set of thermonuclear charges (weight, energy release);
- technical safety means and exploding technologies;
- designs of platforms with charges and technologies of software-hardware procedures coordinated with capabilities of rocket delivery means for:
  - the "near interception" system on duty operating from ten hours to several days;
  - the "distant interception" system operating from several month to one year.

WAYS AND FORMS OF INTERNATIONAL COOPERATION.

- Set up the International Institute aegis of the United Nations Organization to coordinate the works on the system of terrestrial defense from TCO.
- Work out the Russian proposal for the World Community:
  - proposals for meetings at the summit;
  - proposal for the Anniversary Session of UNO;

    proposal for cooperation at a yearly political and economic forum in Davos.
- Combine the unclassified project character and regime of rocket-nuclear technology nonproliferation;

  the charge and explosion system environment excludes unauthorized explosion on the Earth; special safety requirements;

  operation of the system in "UNO hands";

  "equipping" the system on the principle of a "piston" setting at the last moment before the start by the nuclear club country operating the system of terrestrial defense from TCO.
- The system of terrestrial defense from TCO is the first stage of approach to employment of cosmic bodies for technologies of cosmic ecopower based on orbital solar mirrors:
  - night-time illumination of cities;

    raising the productivity of agriculture in the regions of critical farming;
  - raising the sea productivity in circumpolar regions;
  - show melting control in threat zones;
  - solar central heating and power plants.

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"Efficiency of pulse transfer to an asteroid for deviation of its trajectory by distributed energy of a system of nuclear explosions near its surface"

Report at An International Technical Meeting
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The specific nature of effects produced by the nuclear explosion on hazardous cosmic objects (asteroids and comets) is an extremely high initial energy concentration at specific temperatures of about tens of millions of degrees. At such energy concentrations the specific weight of the radiant energi and hence the energy radiation into space become essential. This radiation specifies useless and irretrievable losses of the nuclear explosion energy.

Another aspect of the high energy concentration is a low efficiency of the explosion energy use for imparting momentum to an asteroid. The matter particle, leaving asteroid with the kinetic energi of E_K, takes momentum

$$P = \sqrt{2*M*E_K} ,$$

while giving to asteroid the same momentum of the opposite sign.

If in this case evaporation of the asteroid matter takes place and q portion of E energy acquired by the particle is spent for doing this, so that

$$E_K = E - q*E = E*(1 - q) ,$$

then

$$P = \sqrt{2*M*E*(1-q)} .$$

The value of q is never close to unity, and if the energy concentration in a diverging shock wave is lower than some limit (about 5-10 MBar for the iron asteroid), the expenditure on the cosmic body matter evaporation vanishes at all, and q = 0. In terms of maximum effects produced upon asteroid to change its trajectory the greatest possible nuclear explosion energy dispersion over the maximum mass of the body matter is thus seen to be advantageous.

In the context of the present work the factor of nuclear explosion energy losses by radiation has been estimated. These estimates show the following:

1. For the nuclear explosion over the iron asteroid surfase, taking place in a wide range of explosive capacities and distances to the surface (the radiation flux density changed from 10^{15} to 10^{19} erg/cm^2), the amount of energy absorbed by the asteroid surface changes between the limits 3% and 5%. If no special efforts are taken to reduce the energy radiation into the space, the nuclear explosion energy employment is found to be extremely low.

2. If special efforts are taken to reduce the energy losses by radiation (due to screens opaque to radiation), it is possible to decrease these losses by the order of magnitude at 4 kt/m density of distributed explosion energy, thus greatly increasing the nuclear explosion energy use.